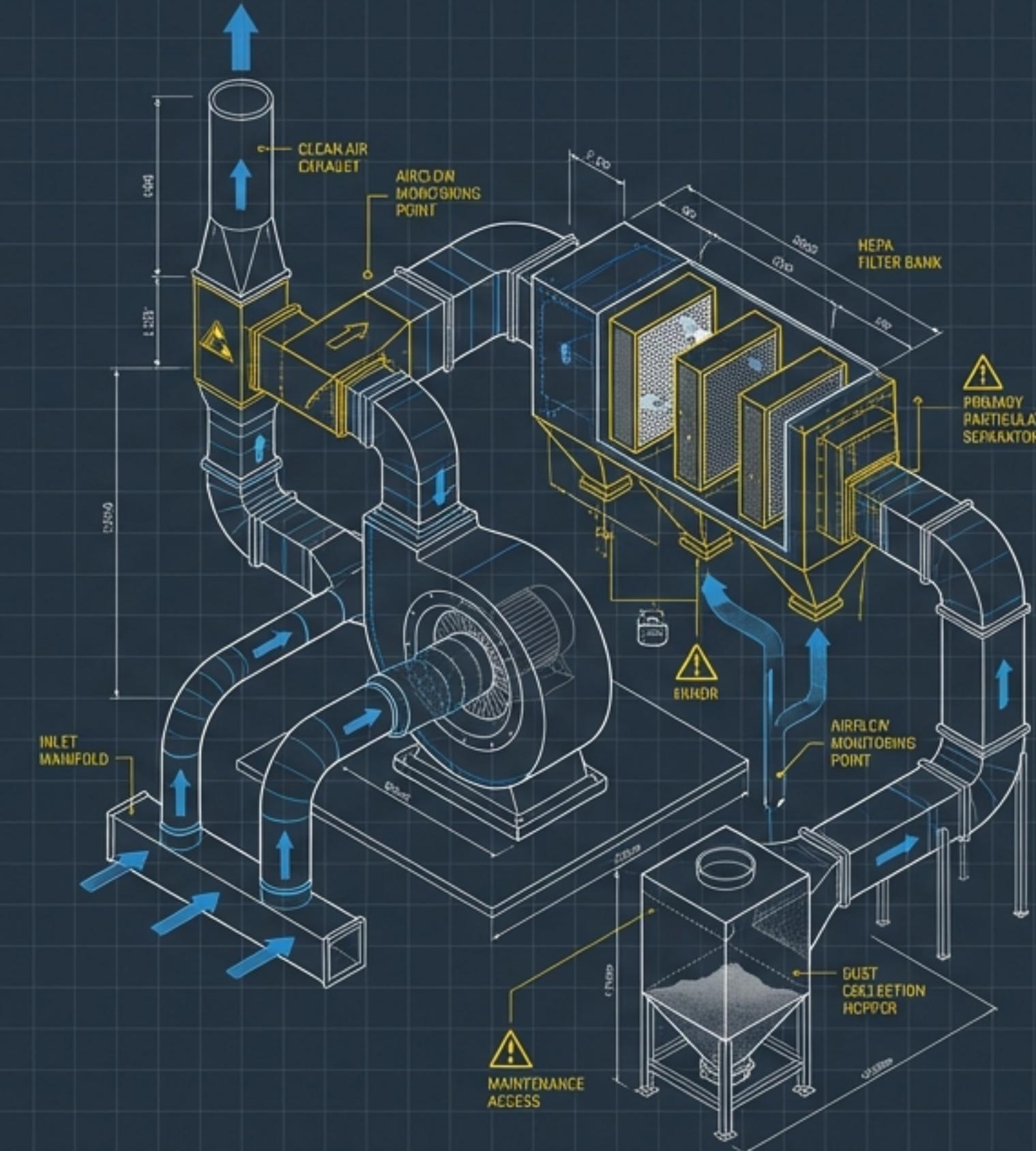
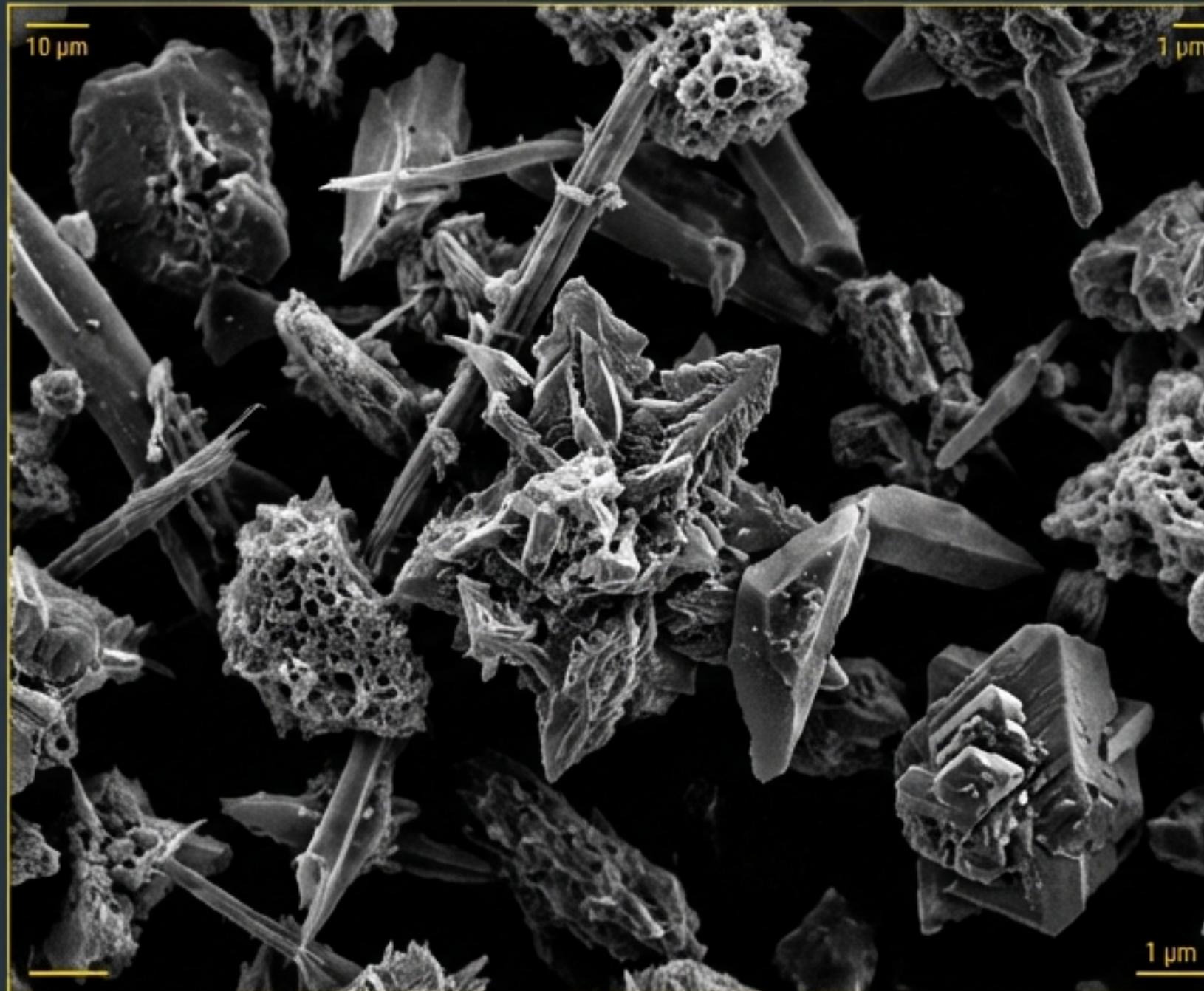
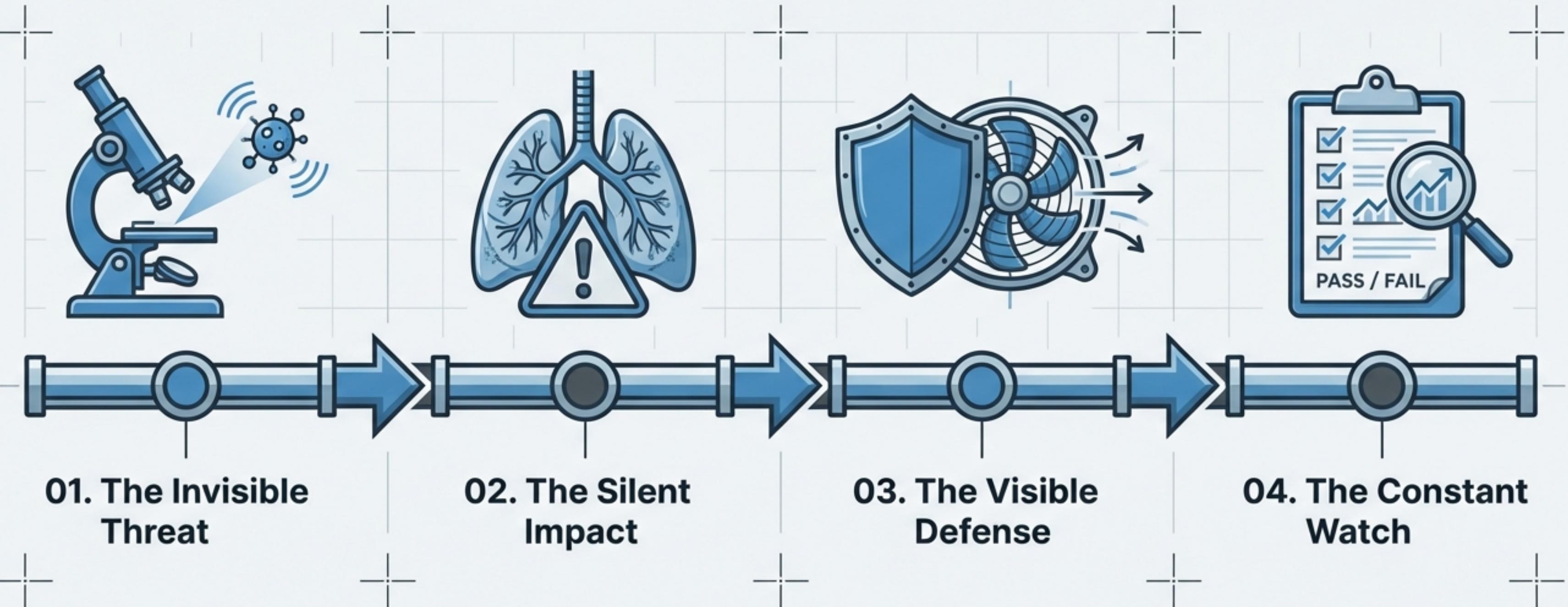


OPERATIONAL DEFENSE AGAINST OCCUPATIONAL DUST HAZARDS

A Technical Guide to GBZ Standards, Risk Control, and Medical Surveillance



THE LIFECYCLE OF THE HAZARD



Protocol Overview: This guide demystifies technical regulations to create a linear defense strategy:
Understand the particle, acknowledge the risk, build the barrier, and monitor the results.

DEFINING THE MICROSCOPIC ENEMY

Occupational dust is solid particles capable of long-term suspension in air.



INORGANIC DUST

Silica ($\text{SiO}_2 \geq 10\%$), Coal,
Asbestos, Cement, Welding Fumes



ORGANIC DUST

Cotton, Wood, Grain Dust

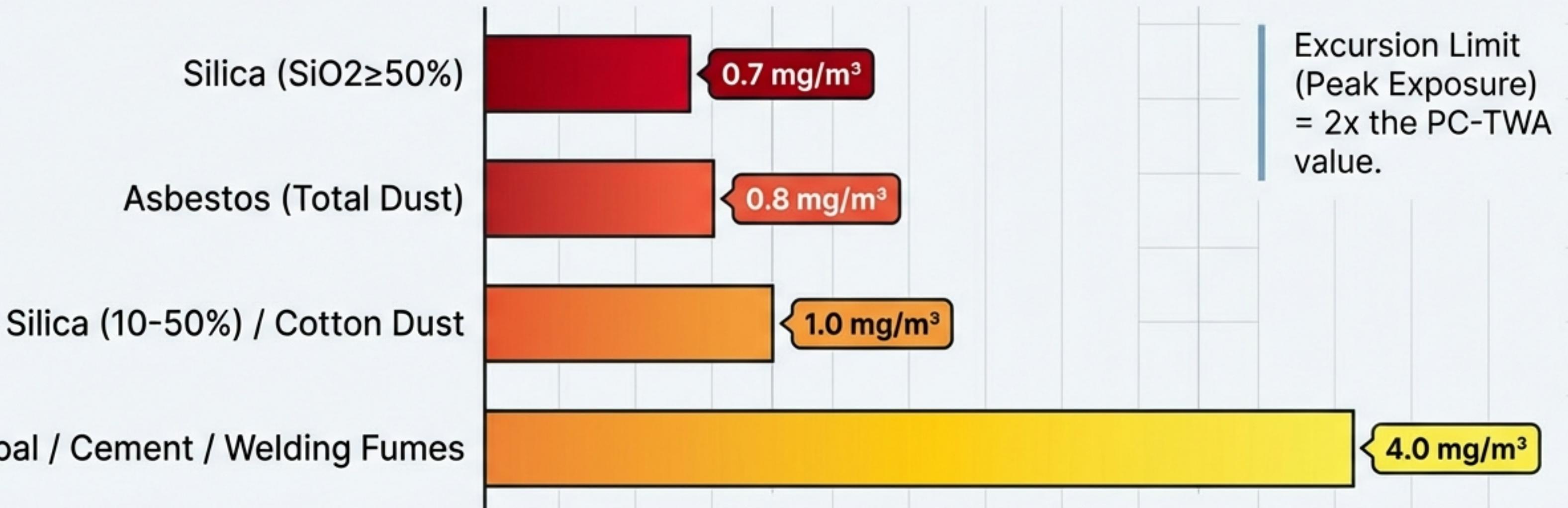


MIXED DUST

Combination of inorganic and
organic types

QUANTIFYING TOXICITY: OCCUPATIONAL EXPOSURE LIMITS

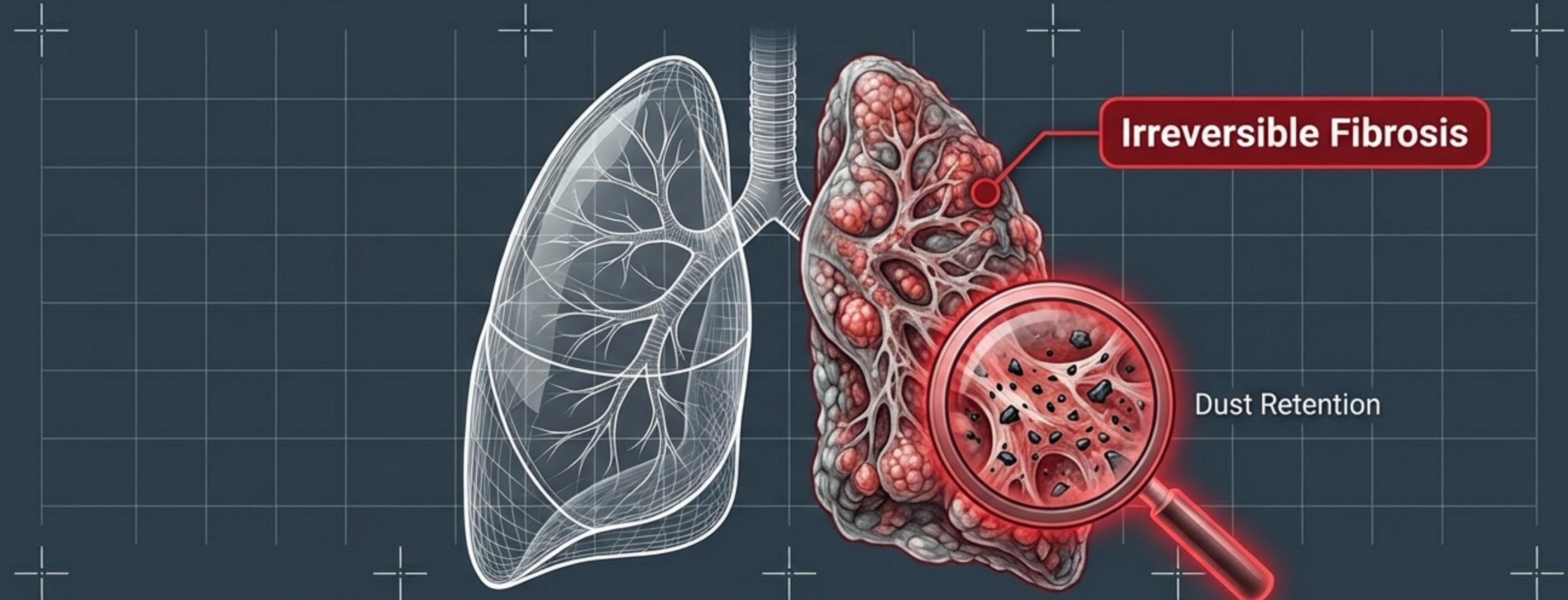
GBZ 2.1-2019 Exposure Limits (PC-TWA)



! INSIGHT: Lower limits indicate higher toxicity. Silica controls must be ~6x stricter than Coal controls.

THE CONSEQUENCE: PNEUMOCONIOSIS (GBZ 70-2015)

A disease caused by long-term inhalation of productive dust, characterized primarily by diffuse pulmonary tissue fibrosis.



PREVENTION IS THE ONLY CURE.

THE 13 CATEGORIES OF STATUTORY PNEUMOCONIOSIS

| | | | |
|---|--|--|---|
| <p>Element Code Apm</p> <p>Silicosis</p> <p>1332</p> <p>Code</p> | <p>Element Code Apm</p> <p>Coal Worker's Pneumoconiosis</p> <p>1328</p> <p>Code</p> | <p>Element Code Apm</p> <p>Asbestosis</p> <p>1336</p> <p>Code</p> | <p>Element Code Apm</p> <p>Cement Pneumoconiosis</p> <p>1328</p> <p>Code</p> |
| <p>Element Code Apm</p> <p>Welder's Pneumoconiosis</p> <p>1328</p> <p>Code</p> | <p>Element Code Apm</p> <p>Potter's Pneumoconiosis</p> <p>1320</p> <p>Code</p> | <p>Element Code Apm</p> <p>Foundry Pneumoconiosis</p> <p>1331</p> <p>Code</p> | <p>Element Code Apm</p> <p>Graphite Pneumoconiosis</p> <p>1332</p> <p>Code</p> |
| <p>Element Code Apm</p> <p>Carbon Black Pneumoconiosis</p> <p>1335</p> <p>Code</p> | <p>Element Code Apm</p> <p>Talc Pneumoconiosis</p> <p>1327</p> <p>Code</p> | <p>Element Code Apm</p> <p>Mica Pneumoconiosis</p> <p>1334</p> <p>Code</p> | <p>Element Code Apm</p> <p>Kaolin Pneumoconiosis</p> <p>1333</p> <p>Code</p> |
| <p>Element Code Apm</p> <p>Other Types of Statutory Pneumoconiosis</p> <p>1334</p> <p>Code</p> | | | |

THE TRIAD OF DIAGNOSIS

1. Reliable occupational exposure history.
2. On-site industrial hygiene data.
3. PRIMARY BASIS:
Posterior-Anterior (P-A) Chest X-ray.

DISEASE PROGRESSION AND STAGING

Stage I



Initial radiographic changes.
Detection here is critical.

Stage II



Stage III



Severe fibrosis and significant
loss of lung function.

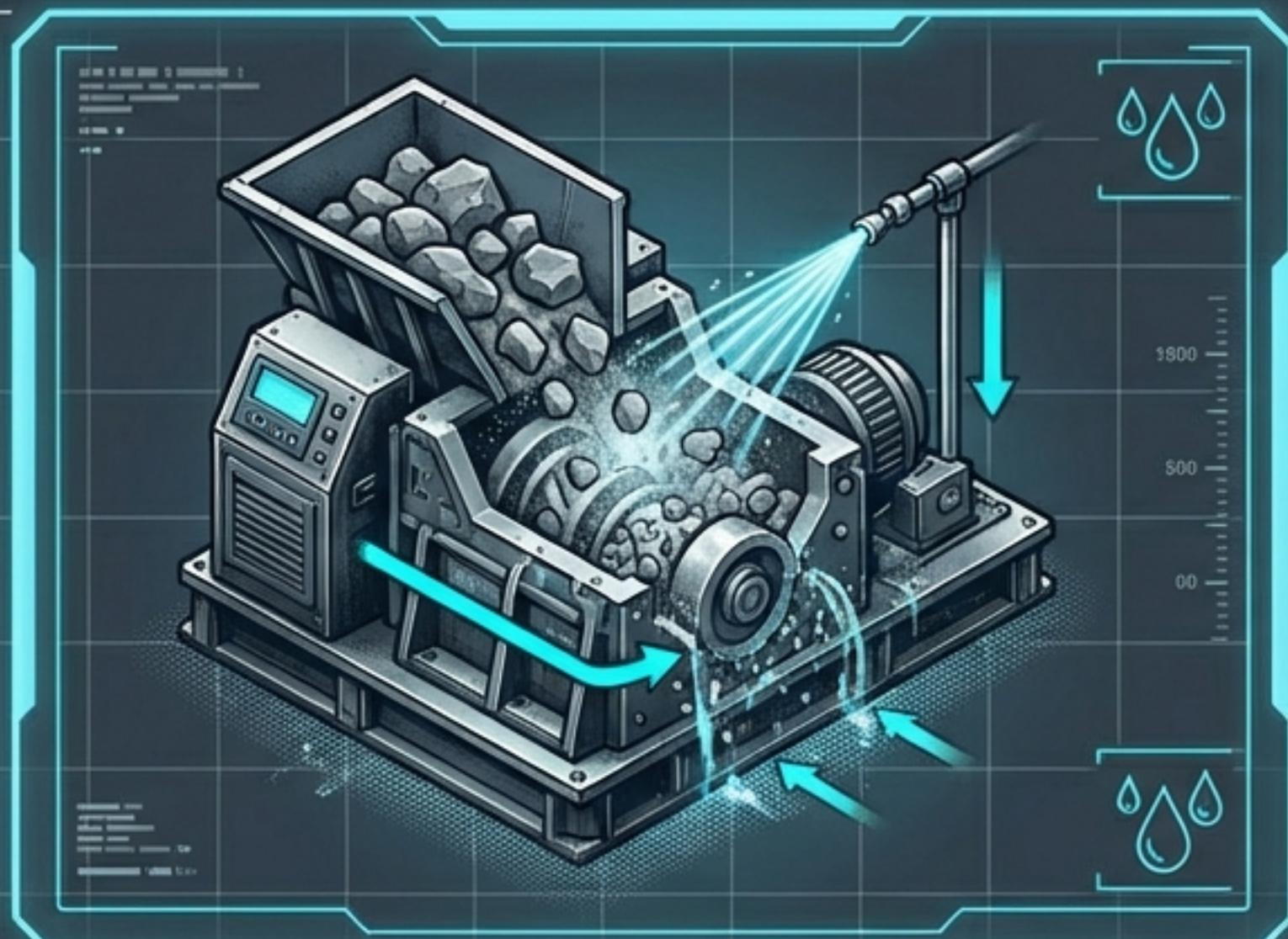
Time & Exposure Accumulation

THE DEFENSE STRATEGY: ENGINEERING FIRST (GBZ/T 340-2025)

Prioritize changing the environment over changing the worker.

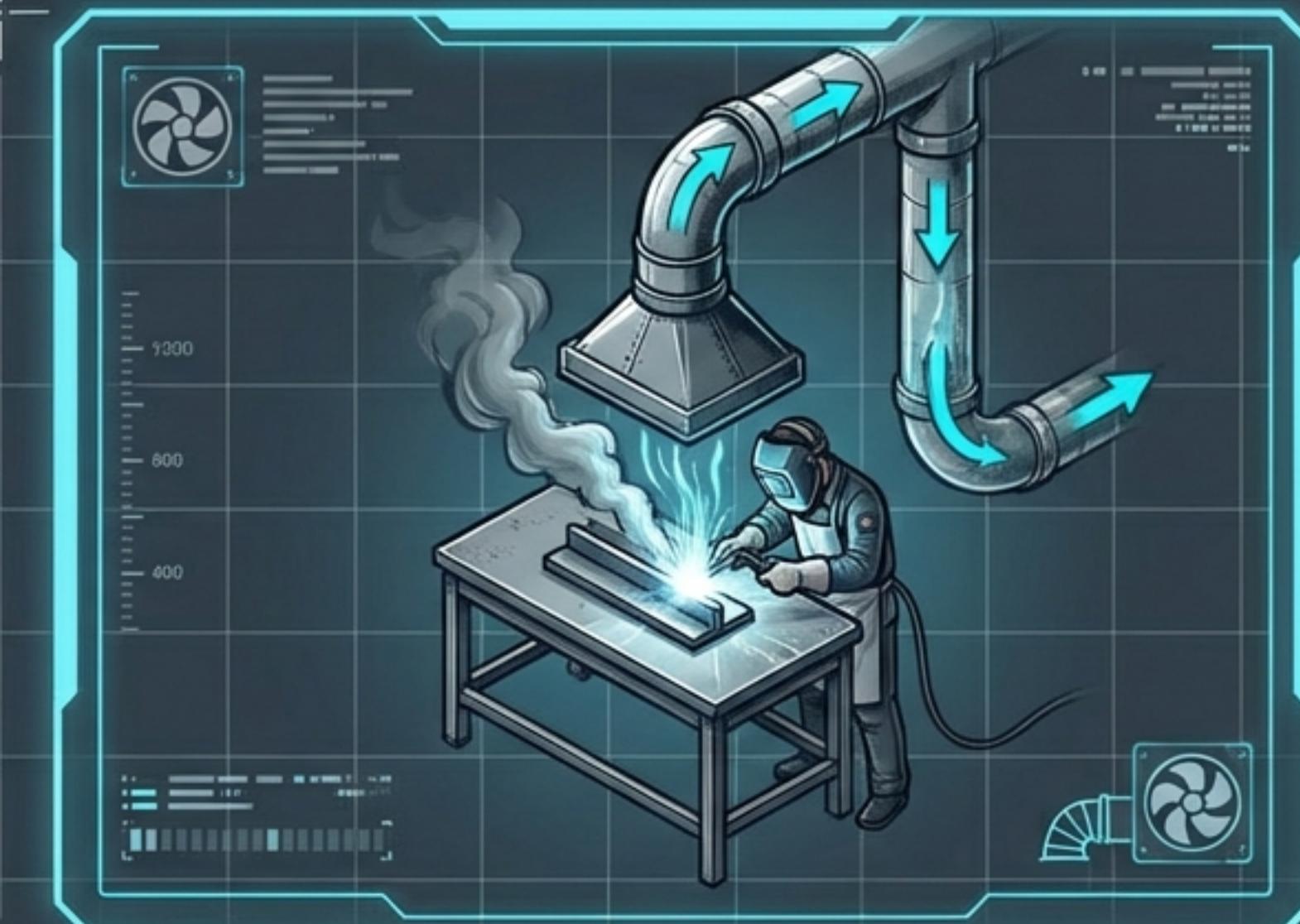


TACTICAL CONTROLS: WET METHODS AND VENTILATION



WET METHODS: Suppression at Source

Spraying water/mist at dust generation points to reduce airborne concentration.



VENTILATION: Capture & Removal

Local exhaust hoods connected to ductwork and dust collectors.

THE LAST LINE OF DEFENSE: RESPIRATORY PROTECTION

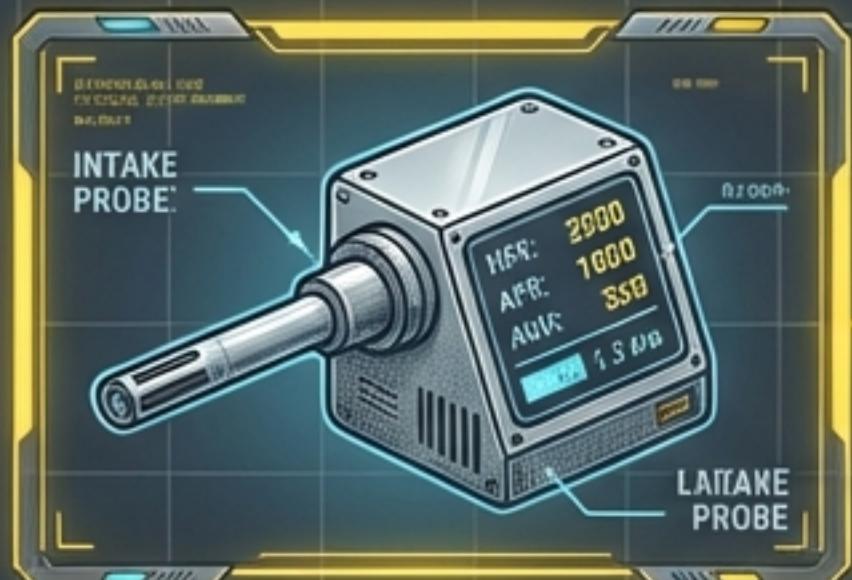
Selection is based on Dust Concentration and Toxicity.

| | | |
|--|--------------|---|
|  | KN90 | Low Toxicity / Low Concentration |
|  | KN95 | General Industrial Dust |
|  | KN100 | HIGH TOXICITY (Silica, Asbestos) |

Silica and Asbestos operations require KN100 Standard.

ENVIRONMENTAL SURVEILLANCE

Workplaces must **test dust concentrations annually** to verify compliance with **GBZ 2.1** limits.



DUST SENSOR



ACTION LIST

- 1. Regular detection.
- 2. Posting results for workers to see.
- 3. Setting "Attention: Dust Hazard" signage at production posts.

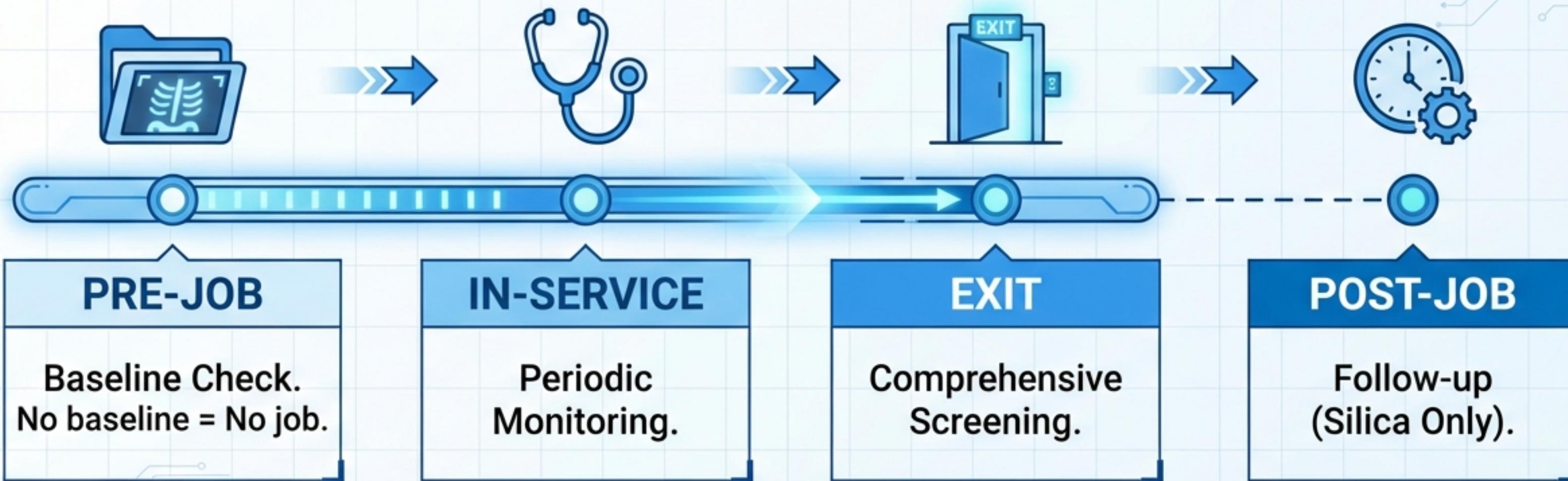


WARNING: DUST HAZARD



NOTICE BOARD: RESULTS

THE EMPLOYEE HEALTH JOURNEY (GBZ 188-2014)



MEDICAL SURVEILLANCE FREQUENCY MATRIX

| OPERATION TYPE | CHECK FREQUENCY | RISK LEVEL |
|-------------------|-----------------|---------------|
| Silica Operations | Every 1 Year | High Risk |
| Coal Operations | Every 2 Years | Medium Risk |
| Other Dusts | Every 2-3 Years | Standard Risk |

For Silica workers, follow-up checks are required even after leaving the job, at intervals of 1-2 years.

OPERATIONAL COMPLIANCE CHECKLIST

Five actionable points for immediate implementation.



01. Engineering Priority (Seal -> Vent -> Wet).
02. PPE Selection (KN95/KN100).
03. Annual Environmental Audit.
04. Health Surveillance Schedules.
05. Education & Hazard Signage.

SAFETY IS A SYSTEM, NOT AN ACT.



Effective dust control protects our most valuable asset: our people.
Compliance with GBZ standards is the baseline for operational excellence.